

REMARKS

Claims 1, 3-15, 17-25 and 27-43 are pending in the present application, claims 2, 16 and 23 having been cancelled and claims 41-43 having been added herein. The Office Action and cited references have been considered. Favorable reconsideration is respectfully requested.

Applicant notes with appreciation the indication that claims 3, 8-14 and 19-20 are objected to as including allowable subject matter, and claims 17 and 27-40 are allowed.

Applicant has amended claim 1 to include the limitation of claim 2 wherein the succession of the layers have been indicated more clearly. The type of "electroluminescence by charge injection" has been added to make a clear distinction with respect to intrinsic electrolumination. Support for this amendment can be found on page 1, lines 9-16 and page 2, line 28, to page 3, line 8. According to Applicant's invention, when the current is continuous, the first electrode is continuously the negative electrode and the second electrode is the positive electrode (see Figures 1 and 4 of Applicants' application). When the current is alternating, the two electrodes are alternatively the negative and the positive electrodes (see Fig. 2 and page 8, lines 23-29).

Claims 4-30 were objected to due to a number of informalities. These have been corrected and withdrawal of the objection is respectfully requested.

Claim 20 was rejected under 35 U.S.C. § 112, second paragraph. Applicant has overcome this rejection by making claim 20 dependent only from claim 19. Withdrawal of this rejection is respectfully requested.

Claims 1, 2, 4-7, 15, 18 and 21-25 are rejected under 35 U.S.C. § 103 as being unpatentable over Hung et al. (U.S. Patent No. 5,776,622). This rejection is respectfully traversed for the following reasons.

Claim 1 recites an electroluminescent device including a first electrode and a second electrode allowing an at least partial passage of light, at least one layer of organic semiconductor showing an electroluminescence by charge injection, a supporting substrate consisting of a metal or metallic alloy, and an electric current source connected to the electrodes in an electrically conductive manner. The substrate has two opposite surfaces comprising an electrically conductive surface which supports the device and a surface which is electrically insulated from the outside. Further, the substrate supports on electrically conductive surface as successive layers 1) the first electrode, which is

continuously or alternatively a negative electrode, 2) the at least one layer of organic semiconductor showing an electroluminescence by charge injection, and 3) the second electrode allowing an at least partial passage of light, which is continuously or alternately a positive electrode. This is not taught, disclosed or made obvious by the prior art of record.

U.S. 5,776,622 to Hung et al. ("Hung") concerns the structure of a cathode to be used in an electroluminescent device. The substrate of this device is comprised of glass, optionally bare or covered with a layer of polycrystalline silicon (see col. 3, lines 41-42). The substrate is consequently non conductive or preferentially a semiconductor so that the substrate contains the driver electronics and pixel switching elements of the device.

The succession of the layers on Hung's substrate are generally as in the U.S. Patent 5,674,635 (cited in the previous Office Action) and in the prior art disclosed in Applicant's description on page 2, lines 3-20, i.e., a substrate, a hole injecting electrode, a layer of organic semiconductor and a bilayer electron-injecting electrode which allows the passage of a light (see Fig. 1 and Examples 1 to 4 of U.S. 5,776,622). Such devices show the same disadvantages

as disclosed in the description of the present application on page 2, lines 21 to 27.

One of ordinary skill in the art understands that semiconducting materials show, besides their main electrical conductivity based on electrons and positive holes, a slight ionic conductivity. This is also the case for organic semiconductors. Any metal polarized positively in physical contact with such a semiconductor is susceptible to undergo an electrochemical oxidation reaction at the metal/semiconductor interface. The intensity of this reaction is proportional to the ratio between the ionic conductivity and total conductivity of the semiconductor. Particularly for steels, this anodic oxidation reaction generates metallic ions (Fe^{2+} for iron). These ions contaminate the semiconductor and progressively change its properties. This results in a decrease of the life of the system, even in the case of use of alternating current.

In one embodiment of Hung (Fig. 2) an inversion of the layers is disclosed, and in this case the substrate 21 is clearly a single crystal semiconductor substrate (col. 3, lines 41-43). The electrode 23 is compatible with the substrate 21 and shows no interactions with the substrate (col. 3, lines. 52-53). Moreover this electrode consists of a

thin insulating fluoride layer 23a and a conductive layer 23b contacting the fluoride layer, which is a complex structure particularly developed to be used with substrates made of inorganic semiconductors, particularly of silicon.

There is also neither disclosure, nor suggestion of an insulation of the substrate with respect to the outside and the supplied current in Hung is readily understood to be continuous current.

Consequently, an ordinarily skilled person having knowledge of the teaching of Hung would certainly not be prompted to use an insulated substrate in metal, particularly in steel, with a succession of layers as claimed in claim 1.

For at least these reasons, Applicant respectfully submits that claim 1 is patentable over the prior art of record.

Claims 2, 4-7, 15, 18 and 21-25 depend from and include the recitations of claim 1. Applicant respectfully submits that these claims are patentable in and of themselves and as at least for the reasons discussed above with respect to claim 1.

In view of the above amendments and remarks, Applicant respectfully requests reconsideration and withdrawal

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of the outstanding rejections record. Applicant submits that the application is in condition for allowance and early notice to this effect is most earnestly solicited.

If the Examiner has any questions, he is invited to contact the undersigned at 202-628-5197.

Respectfully submitted,

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